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by

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AKLAVIK -- A PROBLEM AND ITS SOLUTION

Address delivered by
Mr. R. Gordon Robertson,
Deputy Minister of Northern Affairs and National Resources
and
Commissioner of the Northwest Territories

to the
Twenty-Sixth Annual General Meeting of the Canadian Geographical Society
in Ottawa, Thursday, February 24th, 1955.

Virtually all Canadians at some time or other - and most Canadians most of the time - labour under the illusion that they are a northern people. We are inclined, unconsciously almost to think of ourselves as having a monopoly of northernness. The fact is that while forty per cent of our country lies north of 60°, we all crowd into the southern edge of it, huddled against the United States, and have hardly poked a shivering toe into the cold waters of the north.

The two most northerly Canadian communities of any size are Whitehorse, in the Yukon Territory, and Yellowknife^{*}, in the Northwest Territories. Whitehorse has perhaps 4,000 people and is about 61° north. Yellowknife has some 3,000 people and is about 62° north. About half a dozen other countries in the world have a good many communities much farther north, some of them a good deal larger. Alaska has Fairbanks at 65°; Iceland has Reykjavik, its capital, at 64°; Norway has Narvik at 68°; Sweden has Lulea at 66° and Keruna at 68°; European Russia has Murmansk at 69°, with a population of 150,000. In Siberia there are some cities of over fifty thousand population north of 60° and many substantial communities well within the Arctic Circle.

^{*} See Canadian Geographical Journal, May 1954.

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The only Canadian community of any size that can compete in northerliness with the places I have mentioned is Aklavik. It is roughly 68° north. It is not large - only some four hundred of permanent population at the present time - swelling to perhaps fifteen hundred when Eskimos and Indians come in during the summer. There are, of course, many good reasons why Canada has few towns in the far north. However, Aklavik is our one substantial Arctic community, and recent developments there are of interest.

Aklavik is, in a sense, both the end of the line and the centre of operations. It is nearing the end of the long water transportation system via the Athabasca, the Slave and the Mackenzie Rivers that connects the arctic coast of Canada with the populated regions of the south. Because it is the end of that line, Aklavik is bound to be important as developments proceed in the far north. It is and will continue to be the centre of administration for the Eskimo people of the Western Arctic. As coastal transportation grows in the north its importance will grow. A new factor too has now entered the scene with the decision to construct a Distant Early Warning Line across the extreme north. In short as the Canadian illusion of being a northern people begins to take on some semblance of fact, Aklavik is going to have a steadily growing importance. With this background, it will be appreciated that the decision of the government, taken just over a year ago, to move the entire community of Aklavik to a new location was not lightly taken. This article is about the reasons for the move and the progress that has been made.

Setting

Aklavik lies on a bank of silt jutting into the West Channel of the Mackenzie River. It is in the midst of the Delta formed by deposits laid on the river bottom over the centuries. When you reach Aklavik by air on a summer day, there is an impression of a fantastic jigsaw puzzle of water - hundreds of lakes extending over the horizon - laced together by dark green patches of spruce forests. Below, the brown waters of the Mackenzie wind down to the sea. Far in the distance is the ocean on the north, and the peaks of the Richardson Mountains form a backdrop in the west.

This is the edge of the tree-line. North and east are the barrens, south and west the bush; spruce, balsam, poplar, some birch, and thickets of alder and willow. The trees are stunted and interspersed by short grass, mosses and native flowers. In many places, there are open patches of meadows unable to support even the willow or alder.

Although the ocean is only sixty miles away, the climate of the Delta is continental, with low winter temperatures and exceptionally warm, short summers. Winter begins in late September and lasts for at least seven months. Only sixty days of the year are free of frost. The annual precipitation, in terms of water equivalent, is about nine inches. The average annual snowfall is only about half that of Ottawa. Although the winters are long, in general the climate of the Delta is relatively pleasant for a place approximately one hundred miles north of the Arctic Circle.

The brown bear from which the name of the settlement was derived has largely disappeared from the immediate vicinity of the town. Valuable fur-bearing muskrats still live in the river and its banks, burrowing and breeding in the wet, swampy soil.

It was as a fur trading post that Aklavik was first established. In 1912 a Hudson's Bay Company trader set up camp on the Pokiak Channel opposite the present town, close to an Eskimo encampment. It was halfway between Herschel Island and Fort McPherson, a convenient centre for the trappers of the Delta, and it grew in importance. In time the settlement moved across the channel.

Between 1919 and 1926 the real growth of Aklavik began. Anglican and Roman Catholic missions were established as well as a post of the Royal Canadian Mounted Police. The Royal Canadian Corps of Signals established the first army unit at Aklavik - a signals station. Later the Signals helped to establish station CHAK, the first commercial radio station in the Northwest Territories. Thus, in about forty years, Aklavik has grown from a trading post surrounded by Indian tents to a settlement of permanent houses, commercial enterprises, mission buildings, government offices, and hotels.

Aklavik was built largely on a single resource - the muskrat - and it has been subject to all the hazards arising from a single product. The fur market has always been highly sensitive to the whims of fashion. At best it is uncertain, and the low fur prices of recent years have brought

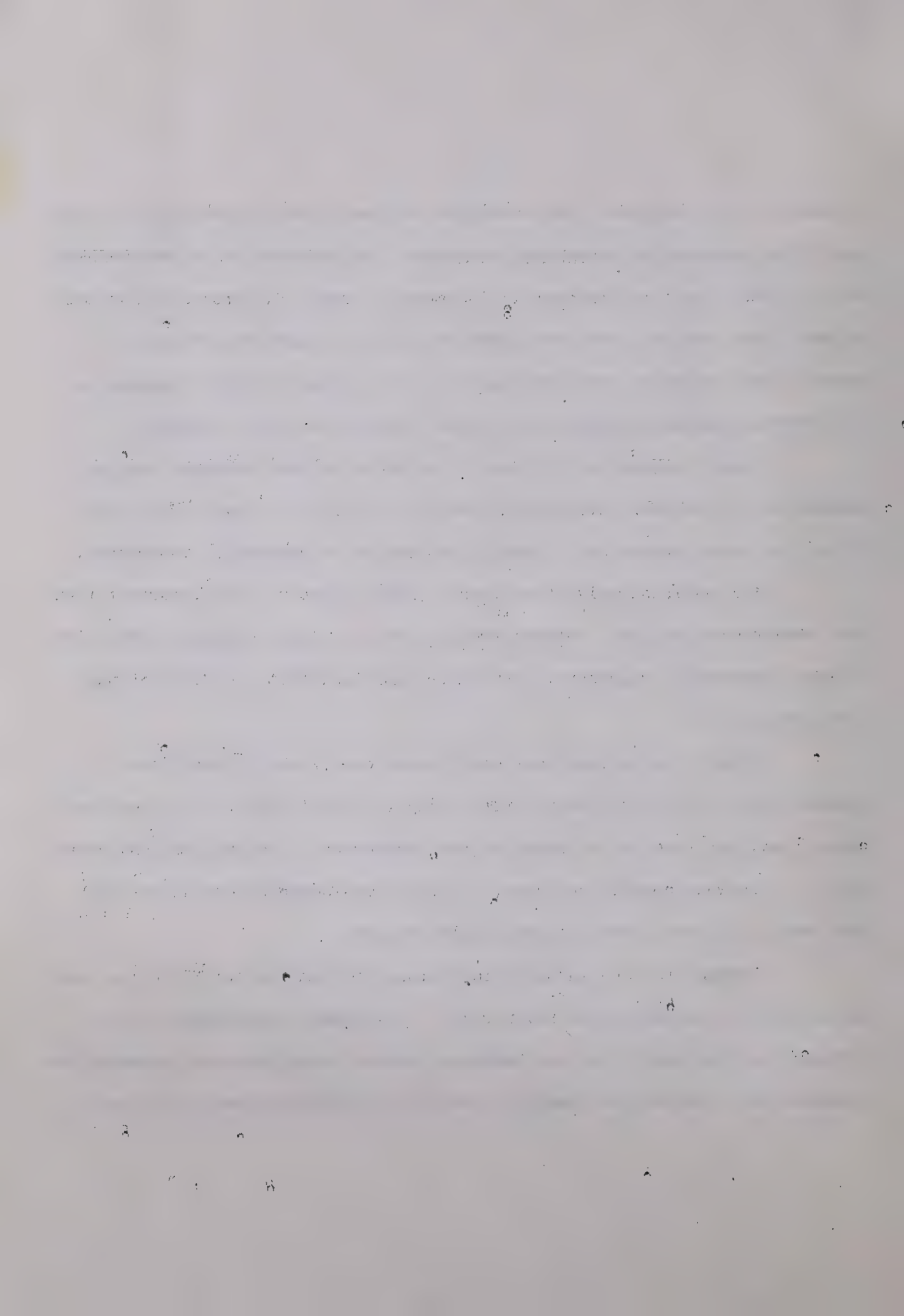
hardship to the trappers. The situation has been further exacerbated in the past five years as the increasing population has resulted in an overcrowding of the productive trapping areas. The average annual fur production in the Aklavik area over the past five years was valued at \$297,000 of which roughly three-quarters came from muskrats. The catch is sold or traded to the various traders in Aklavik by Eskimo, Indian, and white trappers.

Other economic activities in the Delta include reindeer herding, centred on the Federal Government reindeer station on the east side of the Delta, and some hunting and fishing which are of no commercial importance.

The administrative functions of Aklavik are no less important than its economic activities. Between twenty-five and thirty officials from five federal departments represent, with their families, about one-fifth of the total population.

Aklavik is an important educational centre which draws four hundred children from the Delta, from along the Arctic coast as far east as Spence Bay, and from as far south as Fort McPherson. The Anglican and Roman Catholic missions operate churches, hospitals and schools serving not only the local population, but the whole Delta region.

Communities and installations along the west arctic coast can best be supplied by the Mackenzie River route. At present Tuktoyaktuk is the northern terminal point for the Mackenzie system where goods are unloaded and prepared for distribution along the coast of the Beaufort Sea, but a new



Aklavik might also serve as a trans-shipment point for materials going on by air.

Aklavik should be a valuable centre for air transportation. At present it is not, for there is no permanent air strip in the whole Delta. For about three months every year, at break-up and freeze-up, no aircraft can enter or leave. This is a situation which must be remedied in any new site.

The Problem

This, then, is the setting: a fur trading post which has become an increasingly important administrative and communications centre in the far northwest. Why should it be moved?

There are many reasons, but the most important is the nature of the land on which the town now rests. The ground is permanently frozen to a depth of about a thousand feet and the top eighteen inches, known as the active layer, melts and freezes each year. The permafrost extends right to the river bank. The soils are silts with high concentrations of organic materials in low places, and a very high water content; in fact there are about equal amounts of ice and soil.

The permafrost itself need not create serious problems, nor is it impossible to build on silt, but the combination of both is formidable. The first problem is created when the insulating layer of vegetation has to be removed for construction or other purposes. The ice in the soil melts,

but there is no way for the free water to run off. There is no significant ground slope, and the permafrost rules out any sub-soil drainage. Water collects in pools and the gradual process of melting continues. The result, between break-up and freeze-up, is mud, extending from the water's edge throughout the whole community. It is more than an inconvenience. The construction of proper roads is impossible; any form of land transportation is difficult and costly.

The action of melting also seriously affects buildings. When a structure is erected the removal of vegetation contributes to the melting of the permafrost; the heating of the building aggravates the problem. The permafrost melts, and inevitably melts unevenly, causing serious heaving and sagging. Many methods have been tried to alleviate the problem - piles sunk deep in the permafrost, buildings set on rigid frames to allow the structure to float, the use of insulation on the surface. They have had varying measures of success. None can totally meet the problem. The only final solution is to move to ground which has better drainage and lower moisture content.

If the fine grained, wet soil creates problems for roads and buildings, it presents even more serious difficulties in the laying of sewer and water mains. Pipes could be laid even at the present Aklavik, but the cost of installation and maintenance, with expensive pumping equipment, would be high, and there would be no guarantee of uninterrupted service.

Lakes and marsh enclose Aklavik in a tight space against the river channel. There is no practicable way for the town to expand, but it must expand to fulfill the role that its position in the developing north-west has given it. There is a danger that if the town does not move either construction will become increasingly costly on even more unsuitable ground, or the present community will split into two relatively poor sites.

The soil and topography also makes an airfield in the vicinity of the present town impossible. Air facilities are needed not only to serve the town itself but to support activities, including defence projects, in which the town may be playing a part.

The other enemy of the present town, besides the soil, is the river. Aklavik is low lying and subject to flood at break-up. In 1936 and again in 1949 there were serious floods. Even when the river is not flooding, it is eroding the highest ground at the present site, and gradually the edge of the town is being eaten away. It would not be many years until some quite substantial buildings would have to be moved or abandoned.

The Solution

It was with these factors in mind that, just over a year ago, the Government reached its decision to move Aklavik. Many new buildings, government and private, were about to be erected in Aklavik and any delay in deciding to move would have been costly. There was then no alternative site - in fact there was only the scantiest information available - which gives a measure of the urgency of the situation when the decision was made.

The problem of the move of Aklavik, on the official level, lay with the Advisory Committee on Northern Development. This Committee, including senior representation from all departments having direct responsibilities in the north, had made the recommendation to the Government on the need for leaving the present site. The immediate problem was finding a new site. This was the task of the Department of Northern Affairs and National Resources as the body designated by statute to co-ordinate federal activities in the north.

The Department of Northern Affairs organized a site-survey team* which was to live and work in Aklavik from March until late September 1954. Long before it left Ottawa, however, many decisions had to be made. After study in at least a dozen offices, a list of eleven factors by which potential sites were to be judged, was drawn up for the team:-

Essential factors

- (a) Suitability of the site from the economic and social point of view;
- (b) Suitability of the ground for permanent sewer and water systems; foundations and roads;
- (c) Access to a good river channel;
- (d) Availability of a suitable site for an airfield;
- (e) Water supply.

* Other departments played an important part. The Division of Building Research of the National Research Council provided valuable advice and staff. Mines and Technical Surveys, National Health and Welfare, Public Works, and Transport also gave generous assistance.

Highly Desirable Factors

- (f) Sewage disposal;
- (g) Availability of gravel and sand for building;
- (h) Possibilities of the site as a trans-shipment point from river to sea-going vessels.

Desirable factors

- (i) Availability of wood;
- (j) Availability of coal;
- (k) Availability of a hydro-electric power site.

In March 1954 the team set out. Its eight members included five engineers and three specialists in geography and geology. They lived in a camp which was moved from one potential townsite to another by tractor trains, snowmobiles, dog-teams, and, as the season progressed, by scows, barges, and light river craft. The first base camp was set up on the Husky Channel. It was to move four times.

Most of the team already knew Aklavik, and for weeks before arrival they had painstakingly studied mosaics of the area prepared from aerial photographs. When the expedition started its field work there were nine possible sites. Five were ruled out early from a preliminary examination of the ground. That left two possible places on the west delta flank and two on the east channel.

If possible, the team hoped to find a suitable site on the west side. Most of the trap lines and the caribou hunt are in that area, and to

the west lies Peel Plateau, where some day oil may be developed. The west would give the best possibility of land communication with the south. No site could be chosen, however, unless it passed the five essential tests.

Initially, then, the survey work was concentrated on the west side of the Delta. The Husky site moved into the lead early. It was close to the present town, between Red Mountain in the Richardson Range and the deltaic deposits of the Husky Channel. The average slope was slight. Topography for town planning and air-strip construction was excellent. Willows and alders up to fifteen feet high grew along the water courses. Vegetation was plentiful.

The Husky site looked hopeful - until the first test pits and core borings were made. The soil was silt, ice-laden silt, that had many of the same faulty engineering qualities that lie at the bottom of the troubles of the present town. The Husky Channel was ruled out.

The team examined the West Channel site, the last chance for a townsite on the west side of the river. It, too, looked hopeful. But once again soil tests were the deciding factor. With the elimination of the West Channel site went all hope that the future Aklavik would lie west of the Delta.

On the east side of the Delta, there were two possible choices, East 4 and East 3. As usual, the first surveys were made by helicopter. East 4 was found to have one asset which neither of the other two possessed -

a deep lake that lay within a mile of the proposed townsite, with ample water for all the town's needs. But East 4 had handicaps. The ground slope was 3 per cent higher than desirable for an airstrip. The slopes on the hillsides were steep. The soil was not silt but boulder clay with a high percentage of ice. If East 3 were no better at least East 4 was possible.

East 3 lies on the east bank of the East Channel, 33 miles from the present Aklavik by land, 70 miles by water. It was the first site that passed the soils test to the satisfaction of the engineers. The soils are mainly granular with extensive gravel deposits in the form of terraces and ridges. The porous gravel allows ice within it to thaw and drain without the changes of shape which cause heaving and settling. Though they are frozen, the gravels are stable from the engineering viewpoint and would provide material for road surfacing and aggregates for concrete.

Not in every respect is East 3 the perfect site. We did not expect to find the perfect townsite in the vicinity of the Mackenzie Delta, but it is a substantial improvement on the present site. All buildings can be placed on land above the river's flood level, secure from river bank erosion. Surface configuration is good for the provision of sewer and water distribution lines. A safe and dependable water supply is available from the channel, though a treatment plant will be needed. There is good land for an airstrip and it can be linked to the town by road. There is access to a good river channel, and an excellent wharf site. East 3, then,

satisfied the five essential qualifications and all three highly desirable ones.

The team's decision was made in August, and for the next two months work was concentrated on this site. A detailed topographic survey was completed and a large-scale map of the townsite was prepared for town planning lay-outs. The greatest care was taken to avoid disturbing the vegetation which would provide not only amenities for living, but an important insulating layer over the permafrost.

By October the final report was in the hands of the Advisory Committee on Northern Development. In November the Government accepted the recommendation that Aklavik be moved to the East Channel site.

The Timetable

The move of Aklavik is a five-year project. The first year's program has been completed on schedule. This summer, work begins on the airstrip, roads, wharf, warehouses and camp buildings. Field tests will be carried out for sites on a provisional town plan.

The coming winter will be occupied with town planning and the design of water and sewerage systems. In the summer of 1956 the outlines of the new town will begin to emerge. Streets will be laid out, water and sewerage systems put in, foundations and basements prepared, and some permanent buildings put up. In the winter of 1956-57 any inside construction work which is possible will be continued. The final construction of

permanent buildings and the removal of buildings from the old site will take place in 1957 and 1958.

The work of these five years will provide a unique pilot study of what it takes to build a modern town on the rim of the Arctic. The reports and records, and above all the on-the-job experience, will be invaluable.

But most important of all is the meaning of the move to the citizens of Aklavik. The new townsite will be one and a half times the size of the present one, with lots of room to grow. An area five times that now occupied by Aklavik has already been surveyed.

There will be better health conditions, no longer danger from epidemics which might be caused by contaminated water or improper sewerage disposal. The deep black mud of breakup time will disappear. There will be proper roads and a good airfield.

The appearance of the new town will be totally changed; it will be the product of careful planning. The worst of the old buildings will be left behind. There will be a better hospital than the Far North has ever known. The Anglican and Roman Catholic missions have agreed to a single hospital operated by the Northern Health Service, in place of the two Mission hospitals now at the old site. There will be a new federal school to help Aklavik fulfil its responsibility as the educational centre of the Western Arctic. The physical surroundings of the new site will be much pleasanter. The land will be relatively dry. The trees will be carefully preserved.

There will be a new usefulness in Aklavik. It will be able to fulfil its functions as a transportation centre. The airport will connect it with the rest of the country all year round.

In the four years which lie ahead there is a tremendous amount of work to be done. In terms of the new Aklavik which is to rise, the effort will be well worth while.

And in these four years we shall be developing more than a new town. We shall be developing a new North.

There will be a new usefulness in Alaska. It will be able to fulfill its functions as a transportation centre. The airport will connect it with the rest of the country all year round.

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